

SI-Table-1. Details the DLS analysis of TEVs, GIONs and TEV-GIONs

Sample Name	DLS analysis		NTA		Surface charge by Zeta sizer	
	Size (Z-Ave)	PDI	Mean size and concentration		Zeta Potential	Mobility $\mu\text{mcm/Vs}$
			Size (nm)	Concentration (Particles/ml)		
TEVs	253	0.26	170	9.3×10^9	-24.5	-1.91
GIONs	71	0.18	58	1.25×10^{10}	-17.5	-1.37
TEV-GIONs	97	0.28	86	1.3×10^9	-29.2	-2.28

SI-Table-2. Details of parameters were considered for the optimization the TEV- GIONs coating procedure.

Parameters	Calculated Values
Surface Area/ Particles	7854nm ²
Surface Area/ ml	2.5×10^{14} nm ²
Mass of one NPs	9.7×10^{-16} g/NP
Mass/mL	2.9×10^{-5} g/ml
Moles of gold/ml	1.5×10^{-7} mol/ml
Surface area of TEVs	196428 .57 nm ²
Au layer thickness	38.2 ± 3.5 nm
Fe ₃ O ₄ Core	8-15 nm